

Water Quality *Event* Monitoring



Regional Natural Resource Management in Queensland

ID: WQEM 0607

Event Summary Load Calculation Fitzroy Catchment April 2006

Introduction

Stream flows in the Fitzroy River catchment were monitored during the 2005/2006 wet season to estimate the load of suspended sediments and nutrients in flood waters. Estimated loads were then used to calculate event mean concentrations (EMC's), a unit used for input to simulation models. The following data were collected during April and May 2006 at two sites in the Fitzroy basin following rainfall centered over the Comet River catchment.

Methodology

River discharge was monitored at Department of Natural Resources and Water gauging stations located at sites 1 and 2 in Figure 1. Manual samples were collected over the hydrograph at Comet weir (Comet River) and Rockhampton (Fitzroy River). Samples were analysed at Queensland Health Scientific Services (QHSS). Load calculations for total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN) were estimated using linear interpolation (NAPSWQ Loads Tool (<http://www.wqonline.info/products/tools.html>)). EMC was calculated by dividing the total event load by the total event flow volume in millions

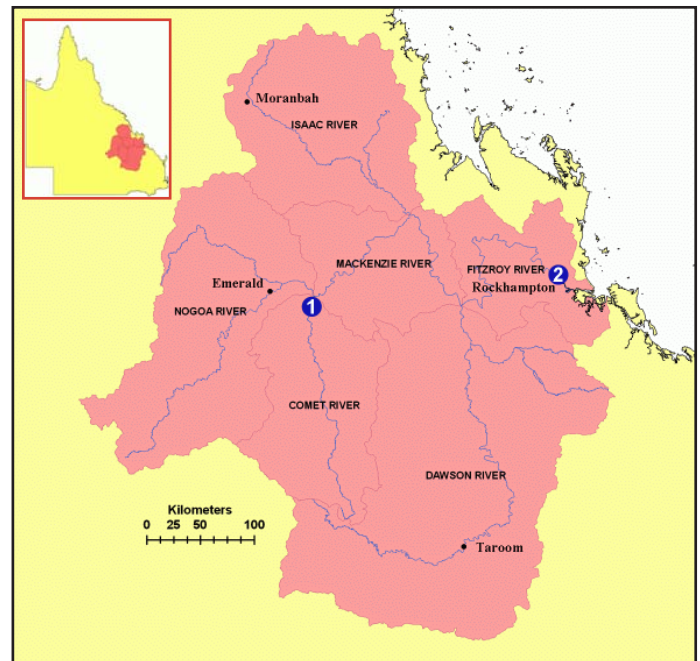


Figure 1. Event sampling locations: Comet River (1), Fitzroy River (2)

Flow Event Description

Heavy rains fell in the south western parts of the Fitzroy catchment (Comet river sub-catchment) from the 4th to the 11th of April 2006 resulting in a cumulative rainfall total of around 253mm (Figure 2). Less intensive widespread rainfall over large areas of the Fitzroy basin also contributed around 50% of the total volume for this event.

| | |
|---------------------------|---|
| Catchment 1: | Comet River. |
| Location: | GS 130504b, Comet weir, Lat 23:36, Long 148:33, AMTD 11km |
| Catchment Area: | 16 400 km ² |
| Dominant Land Use: | grazing 78%, cropping 10%, conservation 6% |
| Event Duration: | 06/04/2006 - 14/04/2006 |
| Catchment 2: | Fitzroy River (Rockhampton) |
| Location: | GS 1300005a, The Gap, Lat 23:05, Long 150:06, AMTD 142.1km |
| Catchment Area: | 135 757 km ² |
| Dominant Land Use: | ~82% grazing, 7% cropping, coal mining |
| Event Duration: | 11/04/2006 - 01/05/2006 |

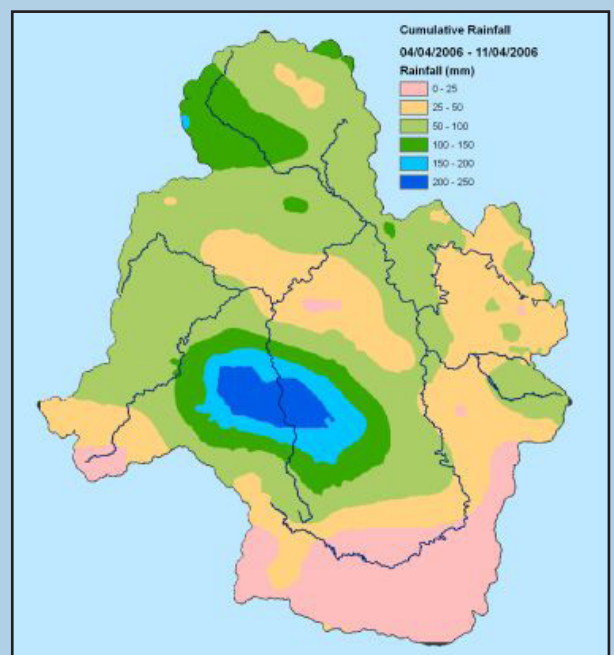


Figure 2. Cumulative rainfall in the Fitzroy Catchment 4/4/06 to 11/4/06.

Results

The EMC's for the Comet River sub-catchment (site 1) were high compared to the Fitzroy River site at the end of the Fitzroy River basin. Sub-catchment concentrations were also much higher for TSS, TP and TN when compared to values for the minor floods of 2005 (see report WQEM 0605, available at <http://www.wqonline.info/products/in-foanddata.html>). The higher upland concentrations for this event are mainly due to the heavy rainfall over country with extensive areas of dry-land cropping. While the 2005 event originated from grazing lands. More details of the Comet Valley event is available from the web link above (Comet Valley April 2006 document).

The relatively low EMC's monitored at the end of the basin were due to a number of factors. One factor was the substantial deposition of suspended sediments downstream of

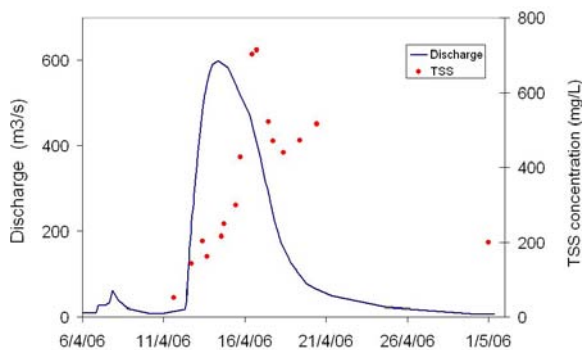


Figure 3. Sample times, discharge and TSS concentration of samples collected in the Fitzroy River (Site 2).

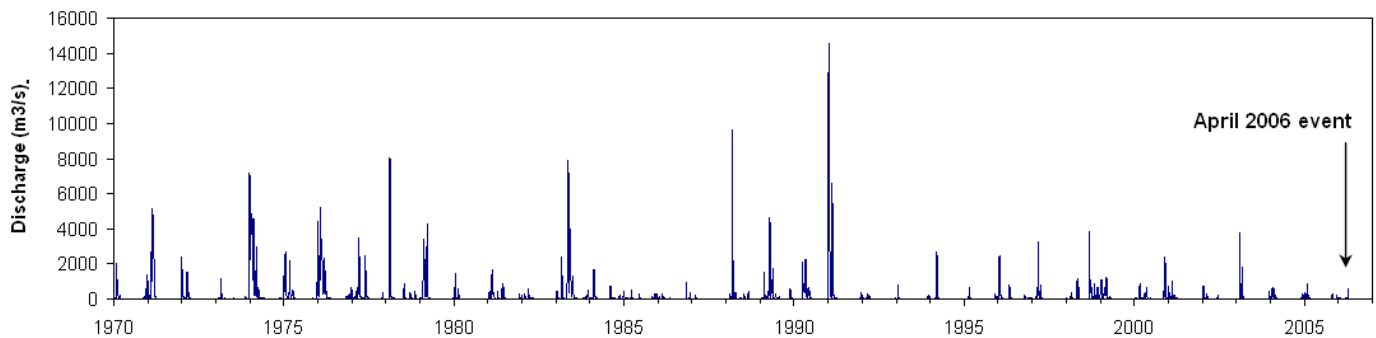
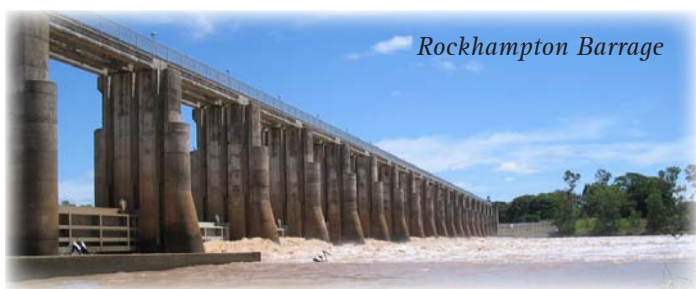


Figure 4. April 2006 event in context to long term discharge for the Fitzroy River (The Gap 130005A).



Rockhampton Barrage

the Comet River monitoring site (derived from a number of samples collected just downstream of the Comet/Nogoa river confluence). The total flood volume at Rockhampton was 271,360 ML, or more than twice the Comet River total. The additional flood water originated from northern and central subcatchments with lower TSS concentrations (not reported here) compared to the Comet River flow. Finally, a substantial amount of the flood water that flowed past Rockhampton was storage water (held in water holes and weirs in the lower Fitzroy). This relatively clean water was pushed through the system in front of the flood waters resulting in maximum TSS concentrations after the peak discharge on the falling limb of the hydrograph (Figure 3).

Table 1. Estimated load and event mean concentration (EMC) for the Fitzroy Catchment April 2006 event.

| | Comet | Fitzroy |
|---|---------|---------|
| | Site 1 | Site 2 |
| Total Event Discharge (ML) | 115 317 | 271 630 |
| Number of samples | 8 | 17 |
| TSS Load (Tonnes) | 281 320 | 95 000 |
| TP Load (Tonnes) | 198 | 116 |
| TN Load (Tonnes) | 332 | 257 |
| TSS EMC (mg/L) | 2 440 | 350 |
| TP EMC (mg/L) | 1.72 | 0.43 |
| TN EMC (mg/L) | 2.88 | 0.95 |
| Max. Event Discharge (m³/s) | 317 | 600 |
| Period of record (yrs) | 33 | 40 |
| Average number of times peak Q exceeded (days/yr) | 4 | 16 |

For Further Information

Contact your regional NAP water quality officer.

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The Comet River event samples were collected by Stewart Neilsen, Peter Burger and Cameron Dougall, Department of Natural Resources and Water, Emerald, and their contribution is greatly appreciated.

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